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07/746,386 08/16/91 AFZALI-ARDAKANI

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EXAMINER

SWOPE, B

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ART UNIT PAPER NUMBER

1105 6

DATE MAILED: 01/05/92

This is a communication from the examiner in charge of your application.
COMMISSIONER OF PATENTS AND TRADEMARKS

This application has been examined Responsive to communication filed on 10-30-92 This action is made final.

A shortened statutory period for response to this action is set to expire 3 month(s), — days from the date of this letter.
Failure to respond within the period for response will cause the application to become abandoned. 35 U.S.C. 133

Part I THE FOLLOWING ATTACHMENT(S) ARE PART OF THIS ACTION:

1. Notice of References Cited by Examiner, PTO-892.
2. Notice re Patent Drawing, PTO-948.
3. Notice of Art Cited by Applicant, PTO-1449.
4. Notice of Informal Patent Application, Form PTO-152.
5. Information on How to Effect Drawing Changes, PTO-1474.
6.

Part II SUMMARY OF ACTION

1. Claims 53-79 are pending in the application.

Of the above, claims _____ are withdrawn from consideration.

2. Claims 1-52 have been cancelled.

3. Claims _____ are allowed.

4. Claims 53-79 are rejected.

5. Claims _____ are objected to.

6. Claims _____ are subject to restriction or election requirement.

7. This application has been filed with informal drawings under 37 C.F.R. 1.85 which are acceptable for examination purposes.

8. Formal drawings are required in response to this Office action.

9. The corrected or substitute drawings have been received on _____. Under 37 C.F.R. 1.84 these drawings are acceptable. not acceptable (see explanation or Notice re Patent Drawing, PTO-948).

10. The proposed additional or substitute sheet(s) of drawings, filed on _____ has (have) been approved by the examiner. disapproved by the examiner (see explanation).

11. The proposed drawing correction, filed on _____, has been approved. disapproved (see explanation).

12. Acknowledgment is made of the claim for priority under U.S.C. 119. The certified copy has been received not been received been filed in parent application, serial no. _____ ; filed on _____

13. Since this application appears to be in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under Ex parte Quayle, 1935 C.D. 11; 453 O.G. 213.

14. Other

EXAMINER'S ACTION

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Examiner acknowledges applicant's amendment filed October 30, 1992. In view of the amendment, the 35 U.S.C. § 112 rejections made in the previous Office action are hereby withdrawn. However, the art rejections are maintained for the reasons set forth below. This action is made "final".

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Repeated Rejections

Claims 53-79 are rejected under 35 U.S.C. § 103 as being unpatentable over US 4,933,106 (Sakai et al.), US 4,940,517 (Wei), US 5,068,060 (Jen et al.) or US 4,771,111 (Tieke et al.).

The present claims are drawn to an electrically conductive composition containing an electrically conductive polymer and a polymer dopant, the method of making such a composition and articles formed therefrom. The electrically conductive polymer and the polymer dopant can be selected from lists of well known conductive polymers and well known polymer dopants. Each of the references listed above teach an electrically conductive composition containing an electrically conductive polymer and a polymer dopant as claimed by applicant. Each reference teaches at least one embodiment of applicant's invention. While some of applicant's dependent claims recite a specific conductive polymer

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with a specific dopant, nothing unobvious is seen in merely selecting a conductive polymer and a polymer dopant from lists of materials that are taught by the prior art.

Sakai discloses an electrically conductive composition, and method of making such, comprising a conductive polymer and a polymer dopant, which can be the same as those presently claimed. See columns 2 and 3. For example, Sakai teaches polypyrrole and polythiophene as polymers and teaches polyacrylic acid, polysulfonic acids and acids containing carboxylic groups as dopants. It would have been prima facie obvious for the skilled to make an electrically conductive composition out of any combination of these polymers and dopants as Sakai clearly suggests that such may be done.

Wei discloses an electrically conductive composition, and method of making such, comprising polyaniline and a polymer dopant. The dopant can be polysulfonic acid and polyacrylic acid. See column 4, lines 4-8.

Jen discloses an electrically conductive composition, and a method of making such, comprising a poly(heterocyclic vinylene) and a polymer dopant. The dopant can be polyacrylic acid and those containing carboxylic acid or sulfonic acid groups. See abstract and column 14, lines 57-65.

Tieke discloses an electrically conductive composition comprising a mixture of polyimide and polypyrrole. See abstract

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and examples.

While all of the references do not contain a specific example teaching each of applicant's embodiments, the suggestion to do so is clearly stated in each patent. The skilled artisan would simply expect that the polymer dopants would produce results similar in degree to the other dopants listed and specifically demonstrated. Nothing unobvious is seen in doing so. Additionally, note that each reference teaches the shaping of the polymer material into useful articles.

Finally, the Examiner notes that some of applicant's claims require that the composition be in a form of a gel. While none of the prior art relied upon appears to disclose a gel composition, the Examiner considers this to be an obvious modification of the composition in the absence of a showing of unexpected results or other secondary showing of non-obviousness. The gel property is highly subjective and appears to be mainly a property of the molecular weight and solvent content. These properties are highly variable by the skilled artisan for the purpose of optimizing such aspects as viscosity and thickness. Further, it appears that the gel form is merely an intermediate state of the composition before making the composition into useful shaped articles or films and hence does not appear to be that significant in defining over the prior art.

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Note that, "... such changes may impart patentability to process if ranges claimed produce new and unexpected result which is different in kind and not merely in degree from results of prior art;... it is not inventive to discover optimum or workable ranges by routine experimentation." (In re Aller 105 U.S.P.Q. 233).

Response to Arguments

Sakai et al.: Applicant argues that Sakai "does not teach the use of a polymeric acid as a polydopant. The doping in this patent i[s] accomplished electrochemically . . . wherein the polyacid is simply the electrolyte. . . . The polyacid . . does not function as a dopant." However, the Examiner respectfully disagrees. Sakai specifically states that the polymer electrolyte/acid is a dopant and teaches that the polymer also acts as a binder and improves the mechanical properties of the highly conductive polymer (col. 5, lines 21-38). This suggests that the two polymers are indeed blended together. Further, even if the disclosure of Sakai is as applicant contends, the Examiner takes the position that the language used in the present broad claims do not exclude such. The present broad claims merely require an electrically conductive blend produced by reacting the two polymers in an organic solvent. This limitation appears to be met by the prior art. The Examiner fails to see how the "doping" of the prior art is different from "reacting" as stated in the present claims. Further, the property

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of being "miscible at the molecular level" would be inherent in the prior art blends since the processes do not appear to be all that different.

Wei: Applicant argues that the "polyaniline/polyacid precipitate [is] from solution. It is not soluble . . . [it] is an insoluble powder. It cannot form a solution and cannot form a gel. Aniline is polymerized within the polyacid." However, the Examiner points out that the present claims, with the exception of the dependent "gel" claims, do not exclude an insoluble powder blend. The present claims merely require that the two polymers be reacted in an organic solvent. This is clearly suggested by Wei. With respect to Wei not teaching a gel, the Examiner maintains that the formation of a gel is simply control of the molecular weight of the polymers, which is within the optimization capabilities of the skilled artisan. If applicant has evidence otherwise, claims limited to gels will be reconsidered.

Jen et al. Applicant argues that Jen discloses "filling polyamic acid or polyimide with a conductor such as graphite. . . The disclosure does not relate to the present invention." The Examiner see no graphite in the disclosure of Jen. Is applicant referring to the correct patent, US 5,068,060 (Jen et al.)? This rejection is maintained since this reference discloses doping a conductive polymer in an organic solution. The dopant may be polymeric.

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Tieke Applicant argues that the polyimide/polypyrrole composite of Tieke is different from the blend of the present invention since the components do not react. And, the polyamic acid of this reference is not used as the dopant as is the case in the present invention. Again however, the Examiner points out that the basic limitation of the present claims appear to be met by this reference. The blend is formed by reaction in an organic solvent. More than mere statements by applicant is necessary to convince the Examiner that the blends of Tieke, which contain the same components and which are produced by a method that appears to fall within applicant's broad process limitations, are not miscible as opposed to the present blend.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. § 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. These patent give additional examples of electrically conductive polymer blends produced with polymer dopants.

The "person having ordinary skill" in this art has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this case reasonably reflect this level of skill.

Any inquiry concerning this communication should be directed to Brad Swope at telephone number (703) 308-2521.

Linda Skalng
Linda Skalng
Primary Examiner
Art Unit 1105

B Swope *BS*
January 4, 1993